administration to the hospital—51, 55, 45, 55, 63, 54, 50, 56, 50 and 55 respectively. Though this may be a mere coincidence it is rare to get so little age variation in a group of patients with a single diagnosis. From the history given by these patients it is suggested that often the blood condition exists prior to very definite symptoms of any sort and the development of symptoms may occupy a long time. We have very little data on which to base an opinion as to the probable average age of development of polycythemia. We know from observations of high blood counts among members of families of patients with polycythemia and symptoms that the condition exists without symptoms, so presumably it develops often long before symptoms occur.

SUMMARY. Nervous symptoms are very frequent in polycythemia vera, and usually they are the symptoms that lead the patient to seek medical advice. Since, quite often, polycythemic patients fail to show cyanosis or erythema, with these nervous symptoms, other cerebral lesions such as brain tumor are suspected. In the earlier stages such symptoms must result from simple circulatory disturbances; in the later stages cerebral softening or cerebral hemorrhage and local vascular lesions, such as thrombosis, are often found.

HEAT STROKE: REPORT OF ONE HUNDRED AND FIFTY-EIGHT CASES FROM COOK COUNTY HOSPITAL, CHICAGO.

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and

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During July, 1916, there were admitted to the Cook County Hospital, Chicago, 158 patients suffering from sunstroke and heat exhaustion; 11 patients were admitted from July 15 to 26 and 147 from July 15 to 31. There occurred 70 deaths, making a mortality of 44.3 per cent. In the last five days of July the weather was unusually oppressive. The temperature for July was the highest of any month in forty-six years. Quoting the report of the U. S. Department of Agriculture, Weather Bureau for Chicago, "July was a record-breaking month both as regards temperature and sunshine. The monthly mean temperature was the highest on record, exceeding by 1° the previous record of 77.4° in July, 1901. The maximum temperature of 101° registered on July 30 has been exceeded only once, on July 21, 1901. From noon of July 26 to 7 A.M. of July 31 inclusive the temperature was continuously above 82°, while the highest minimum on any previous day since the records have been kept was 81.7°." From July 26 to 30 inclusive there was 100 per cent. sunshine, the average hourly velocity of the wind for this period was 6, and the average relative humidity was 58. On July 31 there was a fall in the temperature. The mean was 82, maximum 90, minimum 75; the average hourly velocity of the wind was 16; the relative humidity was 72; the percentage of sunshine was 91.

This report is concerned with the analysis of this series of patients. The information was obtained from two sources: from the hospital histories of the patients, which include the statements of the police at the time of the admittance of each patient, and from subsequent interviews of those patients who recovered. As far as possible each patient was questioned upon his discharge, as to the onset of the disease, the prodromal symptoms, his age, nationality, occupation, the amount of alcoholic beverages consumed in the twenty-four hours previous to the attack as well as the daily average consumption, also the diet and clothing. A number of the patients were unidentified upon admittance, those who recovered were subsequently questioned; and of those who died, many were subsequently identified and the information obtained from the friends.

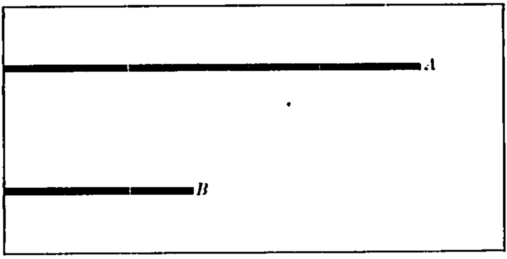

CHART I.—Mortality. *A*, one hundred and fifty-eight patients admitted; *B*, seventy deaths, or 44.3 per cent.

PREDISPOSING CAUSES. Of the 158 patients, 152, or 96.2 per cent., were males, and 6, or 3.8 per cent., were females. The ages of all but 10 were definitely established. There was one nineteen years, or 0.6 per cent. under twenty years; 13, or 8.2 per cent., from twenty to twenty-nine years; 37, or 23.4 per cent., from thirty to thirty-nine years; 41, or 26 per cent., from forty to forty-nine years; 38, or 24.1 per cent., from fifty to fifty-nine years; 13, or 8.2 per cent., from sixty to sixty-nine years; 5, or 3.2 per cent., from seventy to seventy-nine years. One hundred and sixteen patients were in the third, fourth, and fifth decades; adding to these the other 10 who are described as "about middle aged," there is 79.8 per cent. for these three decades.

As to the nationality of the patients, 45 were American-born, 103 were foreign-born, the nationality of the other 10 was not established. One of the American-born patients was a negro, who died several hours after admittance. This is interesting in view of the often expressed view that negroes possess a special immunity against the effects of heat. Of the foreign-born, 24 were Poles, 24 were Slavs, including the Russian group, 22 were Germans, 10 Irish, 6 Bohemians, 5 Lithuanians, 4 Englishmen, 4 Scandinavians, 4 Italians. The occupation incidence was: laborers, 85; teamsters, 12; carpenters, 8; firemen, 4; peddlers, 4; laundry workers, 3; housewives, 3; cooks, 3; clerks, 3; electrician, painter, machinist, seamstress, porter, waiter, 1 each; unknown, 27. These occupations were verified in the case of most of the patients who recovered.

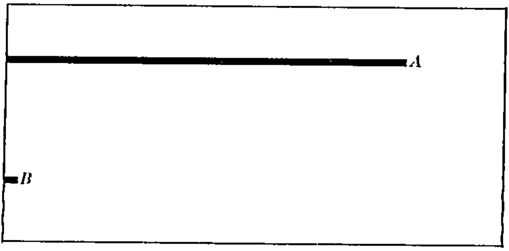

Chart II.—Sex incidence. *A*, one hundred and fifty-two males, or 96.2 per cent.; *B*, six females, or 3.8 per cent.

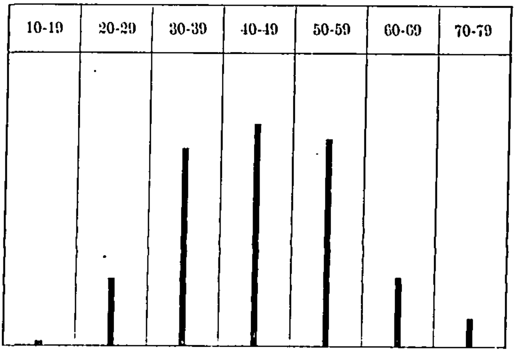

Chart III.—Age incidence. (See text.)

The 27 not established were patients who died without regaining consciousness. The term laborer is used in a broad sense to include all untrained manual workers. Of the established occupations, laborers comprise 64.9 per cent.

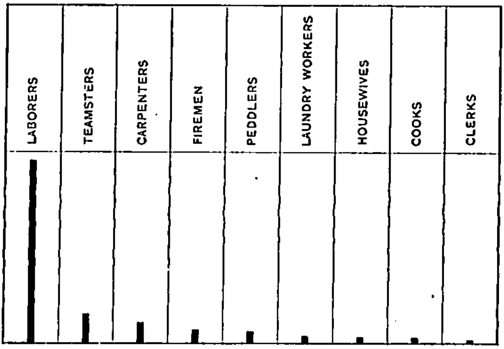

CHART IV.—Occupation incidence. (See text.)

Most of the patients gave a history of alcoholism. Table VI gives the statements of 25 patients, with reference to the amount of beer consumed in the twenty-four hours previous to the attack, also the average daily consumption. In obtaining these statements no effort was made to force an answer. A number of patients also drank whisky. All but 2 of the patients drank beer in the twenty-

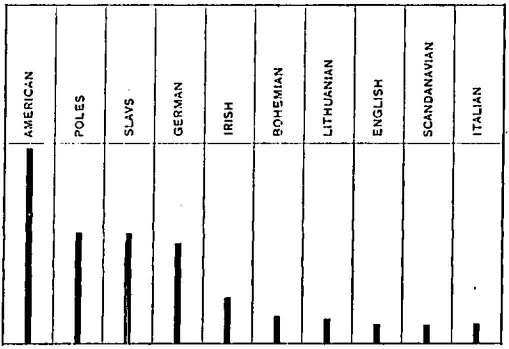

CHART V.—Nationality incidence. (See text.)

four hours preceding the attack, the amount varying from several glasses to one gallon, and all but one had been in the habit of drinking daily. Of those patients who did not recover consciousness there is no definite information, but, judging from the strong alcoholic breath of many of them, it is evident that they too had been drinking freely. Most of the patients questioned had been in the habit of eating meat daily. Of 25 patients, 8 ate it three times a day, 11 twice daily, 5 once a day, and 1 did not eat it at all. As to clothing, the majority wore thin summer cotton underwear, a few wore woolen underwear; the outer clothing consisted of either their regular street suits or overalls.

STATEMENT OF TWENTY-FIVE PATIENTS. ALCOHOL AND HEAT STROKE.

No.	Beer consumed in 24 hours before attack.	Average daily consumption.
1	1 bottle	1 to 2 glasses
2	1 gallon	5 to 10 glasses
3	2 bottles	2 to 4 bottles
4	3 glasses	2 to 4 glasses
5	6 bottles	3 to 4 glasses
6	8 bottles	2 bottles
7	4 glasses	5 to 6 glasses
8	....	....
9	3 pints	3 to 4 pints
10	2 glasses	3 to 5 glasses
11	1 pail	2 pails
12	1 bottle	1 to 2 bottles
13	1 pint	1 pint
14	1 pint	1 pint
15	3 bottles	3 to 4 bottles
16	5 bottles	3 to 4 glasses
17	3 pints	3 to 4 pints
18	3 pints	2 to 3 pints
19	6 glasses	2 to 3 pints
20	1 bottle	1 bottle
21	4 glasses	3 to 4 glasses
22	2 bottles	1 pint
23	3 glasses	4 glasses
24	5 to 6 glasses	15 to 20 glasses
25	....	2 to 4 glasses

Pathology. Postmortem examinations were performed by Dr. E. R. Le Count. The following anatomical alterations were found: edema of the leptomeninges, brain, and lungs; cloudy swelling of the myocardium, liver, and kidneys; fatty changes in the liver; petechial hemorrhages in the brain, viscera, and skin.

Symptomatology. The period of prodromal symptoms was found to vary from five days to a few seconds. The patients complained of headache, dizziness, malaise, anorexia, polydipsia, nausea, vomiting, diarrhea, epigastric distress, restlessness, stupor, insomnia, dyspnea. Headache and dizziness were commonest, and occurred in most of the patients. It was observed that in many patients in whom the prodromal period was a day or more the temperature on admittance was not high; where the period of prodromal symptoms was a few hours or less the temperature was high. This was not always true; the reverse was also noted, but less frequently. In a number of patients the attack came on instantaneously. One teamster left his wagon to get a drink of water; he felt perfectly well when he left his seat; as he stooped to drink from the fountain, he felt himself slipping, and remembered nothing further until he awoke in the hospital. He had a temperature of 110° on admittance. A laborer who also had a temperature of 110° stated that he was cleaning street cars at a terminal barn, and that he was just leaving one car to enter another when he lost consciousness. He insisted that he knew nothing after leaving the car, and that he felt perfectly well up to that moment, and had no unpleasant sensations then. A number of patients who had severe headaches and who were dizzy went walking in effort to find relief, and dropped in the streets; many were lying in bed when they lost consciousness. The nature of the place the patients were found was specifically stated in the police reports of 121 patients; 40 were found in the streets; 49 were brought from private homes; 18 were brought from lodging houses; 14 were found at places where they were working; 5 patients walked to the hospital; 1 of these had a temperature of 104.8°.

The temperature on admittance varied from 94° to 114°. In recording the temperatures the usual clinical thermometers were used. In a number of patients the mercury was forced to the upper end of the thermometer. These thermometers are calibrated up to 110°, but the space above the 110° mark, calibrated on the same scale, is equivalent to 4°. It is probable that if suitable thermometers had been on hand even greater temperatures would have been recorded. A laboratory thermometer was used on a few patients; temperatures of 113° were recorded; but these thermometers are not self-retaining, and the mercury fell rapidly when the thermometer was removed from the body; so these do not represent the maximum temperatures. In this paper all temperatures above 110° will be grouped with 110°. Heat cases are usually classified into heat exhaustion and sunstroke according to the temperature of the patient. The former are described as having subnormal to normal temperatures, and the latter very high temperatures. In this series there is no strict line of separation. All temperatures between the two extremes mentioned were found. The admittance temperatures and number of deaths occurring in each were as follows: 1 patient was admitted with a temperature of 94°, he recovered; 2 patients had 97°, they recovered; 8 patients had 98°, 3 of them died; 15 patients had 99°, 2 died; 6 patients had 100° and 2 died; there were 12 with 101° and 3 deaths; 5 with 102° and 2 deaths; 5 with 103° and 2 deaths; 7 with 104° and 3 deaths; 9 with 105° and 3 deaths; 7 with 106° and 3 deaths; 16 with 107°

and 4 deaths; 6 with 108° and 3 deaths; 19 with 109° and 5 deaths; 38 with 110° and 31 deaths. Four patients died before their temperatures could be recorded. The temperature curves presented a great number of variations. Following the hydrotherapeutic measures to which the hyperpyrexial patients were subjected, there was a sudden fall in the temperatures, varying from 2° to 14°, and subnormal temperatures being reached frequently. In some

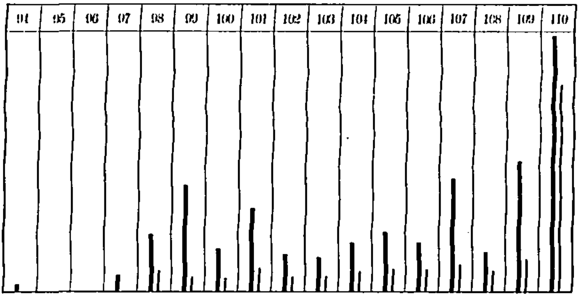

Chart VI.—Admittance, temperature, and deaths. The heavy lines indicate the number of patients, the light lines the number of deaths in each group. (See text.)

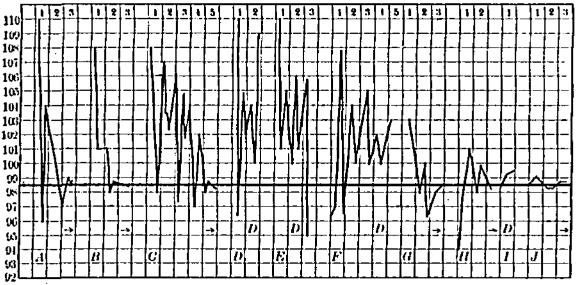

Chart VII.—Temperature curve types. *A*, high temperature with drop of 14° in one-half hour, patient recovered; *B*, high temperature with slower progressive drop and no recurrences, patient recovered; *C*, high temperature with several recurrences, patient recovered (note the periodicity); *D*, high temperature with death occurring on an ascending temperature; *E*, high temperature with death occurring on a falling temperature; *F*, subnormal temperature with marked rise in several hours, patient died; *G*, intermediate type of temperature, patient recovered; *H*, marked subnormal temperature with recovery; *I*, normal temperature followed by death; *J*, normal temperature followed by recovery. All of these patients were comatose upon admittance.

patients there was a slower but progressive fall until normal was reached, which was then usually maintained; in others there were recurrences of 1° to 9°, and 1 to 5 in number. The time that it required the hyperpyrexial patients to return to normal varied from ten minutes to three days. When the return to normal was less than several hours, recurrences usually took place. The terminal temperatures varied from 95° to 110°. A few patient admitted with subnormal temperatures had a rise of 5° to 9° within a few hours.

The pulse-rates on admittance were roughly proportional to the temperatures. Patients with temperatures up to 99° had pulse-rates from 70 to 104; in patients with temperatures from 100° to 102° the pulse-rates were 80 to 134; patients with temperatures from 103° to 107° had pulse-rates from 112 to 152; patients with temperatures above 108° had pulse-rates from 148 to 180. The pulse-rates usually fell with the temperature and rose with it. Comatose patients with high temperatures usually had an easily compressible, rapid, weak peripheral pulse. The quality of the pulse usually improved with the fall in temperature, and became weak, irregular, and imperceptible if the coma deepened or the temperature rose.

The respiration of comatose patients was usually labored, rapid, shallow, and gasping. Many patients uttered a respiratory grunt or moan with each inspiration. Coarse mucous rales were heard in large number, and a tracheal rattle in the fatally ending cases. The respiratory rates varied from 16 to 48 in patients with temperatures up to 105° and from 30 to 60 above 105°. The respiratory rates usually returned to normal with the temperature. In many patients a peculiar fetid odor was noted to the breath in addition to the alcoholic odor.

Ten patients injured themselves and sustained slight abrasions of the skin, scalp, tongue, or lips. The skin was commonly hot, dry, and cyanotic, and after a decrease in temperature cold and clammy. Nearly all of the patients had involuntary bowel movements. Many vomited and a few had hemorrhages per rectum and bloody vomitus. After the return of consciousness the appetite was poor and a few had difficulty in swallowing.

The urine of 25 patients was examined on their second day in the ward. In all, large numbers of hyaline and granular casts were found; in all but 5 pus cells were found. Albumin, as determined by the nitric acid ring test, was observed in 5, and sugar in 1. The specific gravity average for the 25 was 1.020. The systolic blood-pressure was taken on these same patients. Four were between 90 and 100, 3 between 101 and 110, 4 from 111 to 120, 9 from 121 to 130, 2 from 131 to 140, and 1 each in the three next 10 mms. White cell counts also made on these patients varied from 7200 to 20,200. There were 3 under 10,000, 13 from 10,000 to 15,000, and 9 above 15,000. Differential cell counts were within the limits of normal in 18, and in 7 there was an increase in the percentage of lymphocytes.

One hundred twenty-nine patients were in coma on admittance, 10 were stuporous but could be aroused, 3 were in active delirium, and 16 were conscious and rational. Fifty-eight died without regaining consciousness and 10 had relapses after regaining consciousness and died; the other two deaths occurred in patients who were conscious on admittance. The reflexes varied with the depth of the coma. In the deep comatose condition all the reflexes were abolished, even the corneal in several instances, in the semicomatose condition, the superficial reflexes were absent, and in the conscious patient all the reflexes had returned. Most of the patients manifested some form of symptoms resulting from cerebrospinal excitation. Thirty-six patients had generalized convulsions of either the tonic or clonic type, and in a few patients both forms occurred. Clonic convulsions lasted from one to ten minutes and occurred from one to six in number; the tonic convulsions lasted from one to five minutes. Focal tonic and clonic convulsions occurred in 24 patients; the parts of the body involved were the extremities, lower or upper, or frequently a single limb, also the neck and muscles of the face. In the convulsive attack as well as in the mental symptoms, a resemblance was noted in many instances to the epileptic attack. Two patients uttered a shrill cry immediately preceding the convulsions. Thirty-four patients had a form of general restlessness associated with incoherent muttering or active delirium. Only 54 patients did not manifest some form of these symptoms according to the records, and this figure is probbly too high. In the great stress that the hospital staff was suddenly called upon by this emergency it is probable that many symptoms went unrecorded, the best efforts of the staff being directed to the patients themselves; the fact that many of the records are complete even to details speaks well for the resident and nursing staffs. Upon emerging from coma a number of patients had marked disturbance of speech. Although they appeared to be rational and could consistently answer questions which required an affirmative or negative shake of the head, their spoken answers were inarticulate, guttural, meaningless sounds; a few would not attempt to speak at all; others manifested a form of ill humor commonly met in epileptic patients following an attack, in which the patient's attention can be attracted but not held, and questioning seems to irritate them. In other patients orientation was lost. Orientation as to person returned first, then to place, and lastly but somewhat delayed to time. A few patients seemed to have delusions and hallucinations; thus one patient was afraid that his wife and daughter were trying to kill him, and another asked who was constantly calling his name. Consciousness generally returned in three to ten hours, and was followed by a deep sleep. In a few instances consciousness returned within a half hour or was delayed to twenty-four to seventy-two hours. An instance of a favorable result was a laborer found unconscious in the street and admitted to the ward in coma with a temperature of 109.2°. He was given a cold water friction bath for fifteen minutes and returned to the ward with a temperature of 100.4°. Fifteen minutes later he was conscious and complained of a slight headache; he fell asleep and awoke several hours later, when he felt well and had a normal temperature. He left the hospital the following day apparently well. An instance of an unfavorable result was another laborer, also found unconscious on the streets, and on admittance, July 26, 10 A.M., had a temperature of 104°. After a similar bath he had a temperature of 102°; he was very restless and talked irrationally; his restlessness continued to the evening and his temperature rose to 104°; his face was flushed and he perspired profusely. July 27 he seemed improved, his restlessness subsided, and he appeared to be rational; he called for water but was unable to swallow it; his temperature was 103°. At 6 A.M. he was observed to have a clonic convulsion of the extremities, lasting a few minutes. At 8 A.M. he again appeared rational, was able to swallow water, and responded well to questions; his temperature was 101°; in the afternoon he appeared stuporous, his temperature was 103°. July 28, at 1 A.M., he had a general clonic convulsion lasting two minutes, following a short tonic spasm of the extremities; he foamed at the mouth and his eyes were blank and staring; following the attack he broke out into a profuse sweat; he remained stuporous until 1 P.M., when he had a similar convulsion, but during the tonic spasm of which his neck became rigid, his head was drawn back, and his face distorted, his temperature was 105°. He remained in a stuporous condition the remainder of the day. July 29 the patient was still stuporous; he was perspiring profusely and his temperature had risen to 109°. Following a cold bath he had another general convulsion and his temperature fell to 96.8°. At noon he was again irrational, very cyanotic; his temperature rose to 105.6°; at 2 P.M. he had another general convulsion; death occurred at 3 P.M.

TREATMENT. All patients with a temperature of 103° or over were immediately placed in a tub of tap water, the level of which was just high enough to cover the body except the head, which was supported in a hammock packed with ice. Vigorous friction was applied to the entire body by four or more persons; ice was freely added to the water, the friction being constantly maintained; the temperature was taken rectally every minute. When the temperature reached 102° the patient was removed from the bath, wrapped in sheets or blankets, and returned to the ward. Generally 102° was reached in ten to thirty minutes. When the patients were returned to the wards their temperature usually continued to fall frequently, reaching subnormal 95° to 97°. Cardiac stimulants were given freely, strychnin, sodium caffein benzoate, digitalis, strophanthus; an ice-bag was placed at the head and chipped ice was given by mouth. For subnormal temperature external heat was applied. For recurrences in temperatures up to 103° cold packs and alcohol sponges were given; above 103° the patient was again given a cold water friction bath. It was observed that recurrent temperatures could not be reduced as easily as the initial high temperature, and in a few instances the temperature continued to rise in spite of prolonged friction in cold water. For restlessness and convulsions sedatives were used; morphin, chloral hydrate, scopolomin, the bromids, and mechanical restraints.

AN ELECTROCARDIOGRAPHIC STUDY OF A HEART SHOWING ECTOPIC AURICULAR CONTRACTIONS, WITH SPECIAL REFERENCE TO THE INFLUENCE OF THE VAGUS NERVES ON THE ECTOPIC FOCUS.

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That the vagus nerves influence the rhythmicity, contractility, conductivity, and irritability of the heart is well known, but it seems probable that the two nerves do not exercise the same influence over the various cardiac properties, at least not in the same degree. The idea is gaining ground that the specialized tissues are more richly supplied with vagus fibers than the main mass of cardiac muscle, and that it is to the distribution of the two nerves that their specific action is due. There is evidence for the belief that the specialized tissue in the region of highest rhythmicity—that is, the right auricular sinus—is supplied mainly by the right vagus; while the specialized tissue between the auricles and ventricles that conducts the impulse downward, receives its nerve supply mainly from the left vagus. The latter, therefore, exercises a greater influence over conduction, just as the right vagus has the greater control over the heart rate. The extent to which the vagi supply the undifferentiated portions of the heart muscle is not so well understood. Cases showing vagus influence on ectopic beats are very rare. Whether this is because such beats usually arise outside the specialized tissues cannot be decided at present. The case forming the basis of this paper shows a vagus influence upon the occurrence of beats that arise in an ectopic focus of stimulus production, and is thought worthy of record for that reason. It is